

# Unexpected high levels of Cobalamin (Vitamin B12). Is PEG treatment useful?

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## Introduction

High levels of serum vitamin B12 is principally due to vitamin supplementation but it can be observed in several diseases such as solid neoplasms, hematological malignancies and liver/kidney diseases. Vitamin B12 assay could be used as an early diagnostic marker of these diseases. Some high results may, however, be due to interference in the assay. Holotranscobalamin (HTC) is the active form of cobalamin and represent  $\approx 20\%$  of the total Vitamin B12 concentration.

## Material and Methods

In this study, we have selected 117 samples with Vitamin B12 value  $>1500$  ng/L on the Roche Cobas 6000 analyzer. Those samples were also analyzed for total Vitamin B12 and HTC on the Abbott Architect i1000sr. We systematically treated the samples with polyethyleneglycol (PEG 6000 40%) for 1h at  $37^{\circ}\text{C}$  and reanalyzed them for the 3 previous tests.

Patients with serum total Vitamin B12 concentrations  $< 200$  ng/L were classified as deficient and borderline when total Vitamin B12 concentration was between 200 and 300 ng/L. A cut-off of HTC concentration was set to discriminate deficiency ( $< 35$  pmol/L), sufficiency (35-128 pmol/L) and high ( $> 128$  pmol/L).

### Statistical analysis:

MedCalc software, version 12.7.7.0 (Oostende, Belgium) was used to perform statistical analysis.

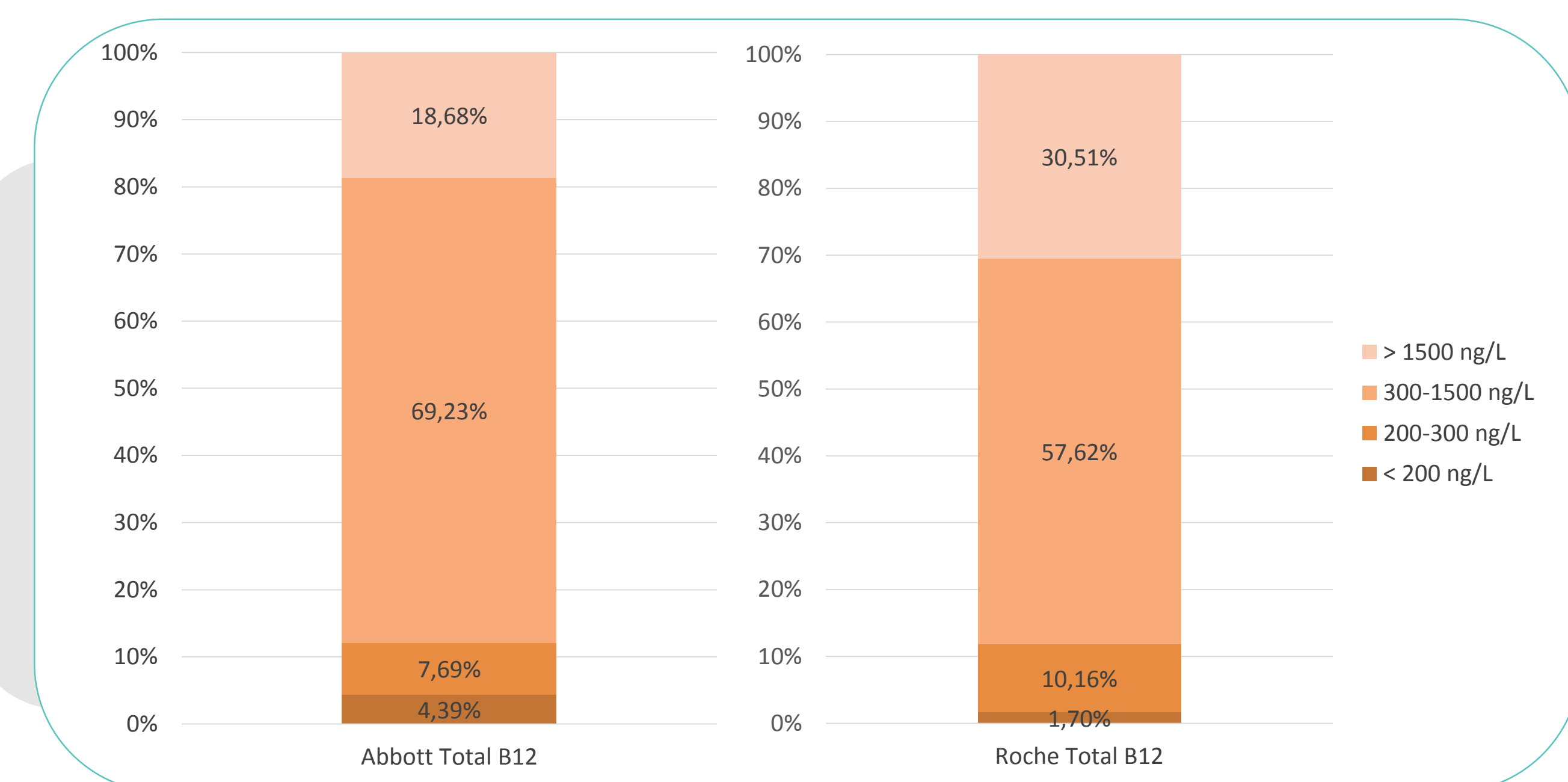


Figure 4 Distribution of cobalamin concentrations after PEG treatment

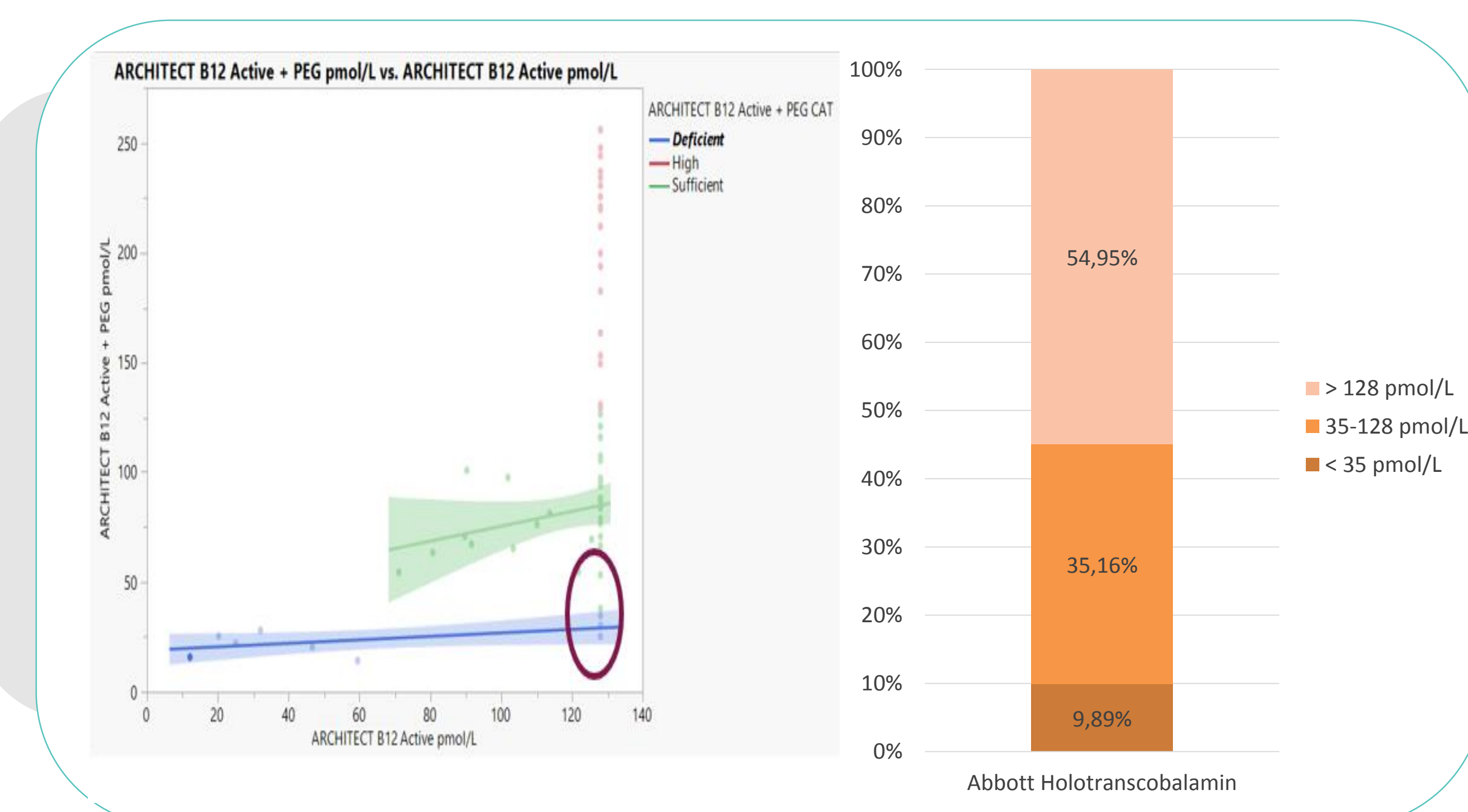


Figure 5 Distribution of Holotranscobalamin concentrations after PEG treatment

## Results

Serum with cobalamin  $> 1500$  ng/L represents 3,5% of the prescribed cobalamin dosage.

There is a drop in concentration after PEG treatment of 44 %, 41 % and 32 % with Vitamin B12 Roche, Vitamin B12 Abbott and HTC respectively. A total of 35 patients (30 %) that presented serum total Vitamin B12 concentration  $> 1500$  ng/L before PEG treatment were still showing results  $> 1500$  ng/L after PEG treatment on the Roche assay. Among the 117 patients, 4 (3,4 %) were HTC deficient before any pretreatment. Conversely, 1,7 % of patients were deficient for cobalamin after PEG treatment with Roche and 4,39 % with Abbott. 10,16 % of the patients were borderline for cobalamin with Roche assay and 7,69 % of them were with Abbott assay after PEG treatment. Also for HTC, there are 9,89 % of samples high before PEG pretreatment and deficient after treatment.

## Conclusions

High prevalence of interference in patients with unexpected high cobalamin level was found in this study. Some of them were even deficient after PEG treatment. Precipitation with PEG is an easy and costless way to decrease interference of Vitamin B12 dosage and increase its reliability. HTC seems to be differently impacted by the interferences since there are deficient patients before PEG treatment with this assay. HCT could be an alternative of systematic treatment of unexpected high levels of Vitamin B12.

## References

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